



BOARD FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS



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California State-Specific Professional Land Surveying Examination Test Plan

adopted November 2002

General Definition of California Professional Land Surveying Practices:

The practice of land surveying in the State of California consists of determining, establishing, reporting and mapping the positions, contours and/or geospatial configuration of points, physical features, property interests, boundary and/or property lines by applying the principles of surveying, mathematics, measurement and law to meet the distinctive requirements of the State of California to protect the health, safety and welfare of the public.

California-Specific Professional Land Surveyor Examination Test Plan

Category A: Project Planning and Research (27%)

Project Planning and Research includes assessing needs of clients, gathering and analyzing data from public and private sources to define scope of services and project design, and negotiating and preparing the final contract.

Job Tasks

- 01 Assess needs of client and legal requirements (e.g., purpose of project, scope, types of services and final product required)
- 02 Conduct research and gather documentation (e.g., recorded maps, deeds, control data, title data, land planning requirements)
- 03 Analyze data about project site (e.g., recorded maps, deeds, control data, title data, land planning requirements)
- 04 Negotiate and secure a written contract with client

Knowledge Areas

Knowledge of:

- K01 sources of public, quasi-public, and private records (e.g., where to find information)
- K02 types of information available from public, quasi-public, and private sources
- K03 federal, state, and local land surveying statutes, laws, rules, and regulations
- K04 laws, ordinances, and regulations related to land planning and/or development
- K05 survey methods, procedures, and standards
- K06 types, uses, and capabilities of survey equipment
- K07 common law related to land surveying practice (e.g., legal principles, civil code, civil code of procedures)
- K08 case law related to land surveying practice
- K09 project constraints (e.g., physical, regulatory, environmental, legal, political)
- K10 procedures to estimate time, materials, and fees
- K11 types and components of title documents (e.g., title report, chain of title, lot and block report)
- K12 source, type, and accuracy of digital data (e.g., metadata, GIS)
- K13 methods for identifying and resolving errors in research data (e.g., map or deed misclosure)
- K15 methods to gather parol evidence
- K16 laws and ordinances pertaining to setting monuments (e.g., California Land Surveyors Act, local ordinances)
- K17 types of deeds and their effect on ownership of property
- K18 effect of riparian and littoral rights on boundaries
- K19 California coastal or tidal lands boundaries
- K20 effect of cloud on title of real property
- K21 criteria for acceptance or rejection of existing monuments

Category A: Project Planning and Research (Continued)

- K22 relationship of land grants to private, state, and federal lands (e.g., Rancho)
- K23 rights-of-way, easements, and encumbrances affecting property rights
- K24 controlling elements in legal descriptions
- K25 effect of sequential conveyances on boundaries
- K26 effect of simultaneous conveyances on boundaries
- K27 methods for calculating and adjusting boundary surveys
- K28 methods of calculating and analyzing errors
- K29 procedures to recover and perpetuate boundary monuments
- K30 U.S. Public Lands Survey System
- K31 effect of ground movement and earthquakes on boundaries
- K32 effect of unwritten rights on boundaries (e.g., adverse possession, prescriptive rights, encroachments)
- K33 methods and procedures for retracement and re-establishment of railroad rights-of-way
- K35 interpretation of construction plans
- K36 basis of control values and their relationship to construction plans (e.g., basis of bearing, benchmark)
- K37 accuracy required for construction staking
- K38 methods for calculating horizontal and vertical alignments
- K39 methods for calculating earthwork volumes
- K40 practices and procedures for construction staking
- K41 methods and requirements for performing an as-built survey
- K42 elements in improvement plans pertaining to construction staking
- K44 methods to obtain bearings or azimuths related to geodetic, magnetic, grid, or astronomic north
- K45 effect of ground movement and earthquakes on control monument positions
- K46 California State Plane Coordinate System
- K47 methods and procedures to produce control networks within accuracy standards (e.g., Public Resources Code, NGS Standards, FGCS Standards)
- K48 procedures for analysis, reduction, and adjustment of raw data to obtain coordinate values
- K49 procedures to recover and perpetuate control monuments
- K50 projections, datums, and epoch dates
- K51 geoid, ellipsoid, and orthometric heights
- K52 error analysis (e.g., multi-path, data input, instrument calibration)
- K54 U.S. National Map Accuracy Standards
- K55 methods and requirements for collecting field positions and attributes
- K56 methods and requirements to identify criteria for mapping
- K57 elements of topographic maps (e.g., contours, features, symbols, legend, metadata)
- K58 methods to produce digital terrain models

Category A: Project Planning and Research (Continued)

- K59 elements required for an aerial flight plan (e.g., photogrammetric, LIDAR)
- K60 practices and procedures for photogrammetric control layout
- K61 procedures for preparation of aerial mapping and contouring
- K62 procedures for preparation of terrestrial mapping and contouring (e.g., total station, GPS, LIDAR)
- K63 state laws and statutes pertaining to photogrammetry (e.g., California Professional Land Surveyors Act Article 5.5 Section 8775)
- K64 photogrammetric compilation (e.g., traditional stereo-plotter, analytical stereo-plotter, orthophotography, soft copy photogrammetry)
- K65 tidal cycles and datums (e.g., tidal stations, mean high water)
- K67 methods to document parcel evidence
- K68 methods of disclosing and depicting encroachments
- K69 depicting physical evidence that may indicate unwritten rights (e.g., adverse possession, prescriptive rights)
- K70 state and local agency processing requirements for parcel maps and final maps (e.g., California Subdivision Map Act, California Subdivided Lands Act, California Department of Real Estate)
- K71 state and local agency processing requirements for corner records and records of survey (e.g., California Professional Land Surveyors Act)
- K72 state and local agency processing requirements for tentative maps or land planning documents (e.g., California Subdivision Map Act, local ordinances)
- K73 graphical methods to represent land boundaries and related information
- K74 methods and procedures for preparing maps, plats, reports, exhibits, and documents (e.g., topographic maps, site plans, as-built plans)
- K75 methods and procedures for preparing parcel maps and final maps (e.g., California Subdivision Map Act)
- K76 methods and procedures for preparing corner records and records of survey (e.g., California Professional Land Surveyors Act)
- K77 methods and procedures for preparing legal descriptions
- K78 procedures and requirements for preparing certification documents (e.g., flood certification, pad certification)
- K79 procedures, standards, and requirements for preparing ALTA/ACSM surveys
- K80 principles of real property law relating to boundaries and conveyances
- K81 signing and sealing requirements
- K82 contractual agreements (e.g., cost estimates, restraints)

Category B: Boundary Surveys (38%)

Boundary Surveys includes evaluating and determining boundary and easement positions (based on field observations, physical evidence, possession, and/or existing documentation) in accordance with accepted standards of practice and in compliance with all applicable statutes, rules and regulations.

Job Tasks

- 05 Inspect site to determine existence of boundary evidence (e.g., monuments, possession, structures)
- 06 Analyze field evidence together with recorded and unrecorded documentation to determine boundaries, easements, and encroachments
- 07 Determine and/or represent boundaries from existing recorded and unrecorded surveys and title documents
- 08 Set monumentation to perpetuate locations of boundaries

Knowledge Areas

Knowledge of:

- K03 federal, state, and local land surveying statutes, laws, rules, and regulations
- K04 laws, ordinances, and regulations related to land planning and/or development
- K05 survey methods, procedures, and standards
- K06 types, uses, and capabilities of survey equipment
- K07 common law related to land surveying practice (e.g., legal principles, civil code, civil code of procedures)
- K08 case law related to land surveying practice
- K11 types and components of title documents (e.g., title report, chain of title, lot and block report)
- K12 source, type, and accuracy of digital data (e.g., metadata, GIS)
- K13 methods for identifying and resolving errors in research data (e.g., map or deed misclosure)
- K15 methods to gather parol evidence
- K16 laws and ordinances pertaining to setting monuments (e.g., California Land Surveyors Act, local ordinances)
- K17 types of deeds and their effect on ownership of property
- K18 effect of riparian and littoral rights on boundaries
- K19 California coastal or tidal lands boundaries
- K20 effect of cloud on title of real property
- K21 criteria for acceptance or rejection of existing monuments
- K22 relationship of land grants to private, state, and federal lands (e.g., Rancho)
- K23 rights-of-way, easements, and encumbrances affecting property rights
- K24 controlling elements in legal descriptions
- K25 effect of sequential conveyances on boundaries

Category B: Boundary Surveys (Continued)

- K26 effect of simultaneous conveyances on boundaries
- K27 methods for calculating and adjusting boundary surveys
- K28 methods of calculating and analyzing errors
- K29 procedures to recover and perpetuate boundary monuments
- K30 U.S. Public Lands Survey System
- K31 effect of ground movement and earthquakes on boundaries
- K32 effect of unwritten rights on boundaries (e.g., adverse possession, prescriptive rights, encroachments)
- K33 methods and procedures for retracement and re-establishment of railroad rights-of-way
- K65 tidal cycles and datums (e.g., tidal stations, mean high water)
- K67 methods to document parol evidence
- K68 methods of disclosing and depicting encroachments
- K69 depicting physical evidence that may indicate unwritten rights (e.g., adverse possession, prescriptive rights)
- K70 state and local agency processing requirements for parcel maps and final maps (e.g., California Subdivision Map Act, California Subdivided Lands Act, California Department of Real Estate)
- K71 state and local agency processing requirements for corner records and records of survey (e.g., California Professional Land Surveyors Act)
- K73 graphical methods to represent land boundaries and related information
- K74 methods and procedures for preparing maps, plats, reports, exhibits, and documents (e.g., topographic maps, site plans, as-built plans)
- K75 methods and procedures for preparing parcel maps and final maps (e.g., California Subdivision Map Act)
- K76 methods and procedures for preparing corner records and records of survey (e.g., California Professional Land Surveyors Act)
- K77 methods and procedures for preparing legal descriptions
- K79 procedures, standards, and requirements for preparing ALTA/ACSM surveys
- K80 principles of real property law relating to boundaries and conveyances
- K81 signing and sealing requirements

Category C: Construction Surveys (9%)

Construction Surveys includes determining information to be staked by analyzing data on improvement plans; performing field observations by collecting, analyzing, reducing and adjusting field data to meet accuracy standards for design of improvements; and providing survey and construction staking.

Job Tasks

- 09 Verify character and position of given horizontal and vertical control
- 10 Perform construction calculations
- 11 Set stakes for construction purposes
- 12 Identify conflicts between construction drawings and actual conditions

Knowledge Areas

Knowledge of:

- K05 survey methods, procedures, and standards
- K06 types, uses, and capabilities of survey equipment
- K09 project constraints (e.g., physical, regulatory, environmental, legal, political)
- K28 methods of calculating and analyzing errors
- K35 interpretation of construction plans
- K36 basis of control values and their relationship to construction plans (e.g., basis of bearing, benchmark)
- K37 accuracy required for construction staking
- K38 methods for calculating horizontal and vertical alignments
- K40 practices and procedures for construction staking
- K42 elements in improvement plans pertaining to construction staking
- K49 procedures to recover and perpetuate control monuments
- K50 projections, datums, and epoch dates
- K57 elements of topographic maps (e.g., contours, features, symbols, legend, metadata)
- K74 methods and procedures for preparing maps, plats, reports, exhibits, and documents (e.g., topographic maps, site plans, as-built plans)
- K78 procedures and requirements for preparing certification documents (e.g., flood certification, pad certification)
- K81 signing and sealing requirements

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Category D: Control, Geodetic and Topographic Surveying and Mapping (11%)

Control, Geodetic, and Topographic Surveying and Mapping includes meeting specified accuracy standards and collecting, analyzing, interpreting developing, reducing, and adjusting data (e.g., Control, Geodetic, Topographic, Photogrammetric, California Coordinate System, horizontal and vertical datums) for the purpose of preparing graphic and/or mathematic representations of existing physical features, terrain, monuments, and geospatial positions.

- 13 Ensure use of proper control datums and epochs (e.g., plane, NAVD88 / NGVD29, epoch 1991.35 / 1998.5)
- 14 Perform topographic survey (e.g., observe and collect field data for digital terrain model or geographic information systems [GIS], hydrography, photogrammetry)
- 15 Determine project boundaries based on requirements and specifications (e.g., area of coverage)

Knowledge Areas

Knowledge of:

- K03 federal, state, and local land surveying statutes, laws, rules, and regulations
- K05 survey methods, procedures, and standards
- K06 types, uses, and capabilities of survey equipment
- K09 project constraints (e.g., physical, regulatory, environmental, legal, political)
- K12 source, type, and accuracy of digital data (e.g., metadata, GIS)
- K28 methods of calculating and analyzing errors
- K44 methods to obtain bearings or azimuths related to geodetic, magnetic, grid, or astronomic north
- K45 effect of ground movement and earthquakes on control monument positions
- K46 California State Plane Coordinate System
- K47 methods and procedures to produce control networks within accuracy standards (e.g., Public Resources Code, NGS Standards, FGCS Standards)
- K48 procedures for analysis, reduction, and adjustment of raw data to obtain coordinate values
- K49 procedures to recover and perpetuate control monuments
- K50 projections, datums, and epoch dates
- K51 geoid, ellipsoid, and orthometric heights
- K52 error analysis (e.g., multi-path, data input, instrument calibration)
- K54 U.S. National Map Accuracy Standards
- K55 methods and requirements for collecting field positions and attributes
- K56 methods and requirements to identify criteria for mapping
- K57 elements of topographic maps (e.g., contours, features, symbols, legend, metadata)
- K58 methods to produce digital terrain models
- K59 elements required for an aerial flight plan (e.g., photogrammetric, LIDAR)
- K60 practices and procedures for photogrammetric control layout
- K61 procedures for preparation of aerial mapping and contouring

Category D: Control, Geodetic and Topographic Surveying and Mapping (Continued)

- K62 procedures for preparation of terrestrial mapping and contouring (e.g., total station, GPS, LIDAR)
- K63 state laws and statutes pertaining to photogrammetry (e.g., California Professional Land Surveyors Act Article 5.5 Section 8775)
- K64 photogrammetric compilation (e.g., traditional stereo-plotter, analytical stereo-plotter, orthophotography, soft copy photogrammetry)
- K65 tidal cycles and datums (e.g., tidal stations, mean high water)
- K68 methods of disclosing and depicting encroachments
- K69 depicting physical evidence that may indicate unwritten rights (e.g., adverse possession, prescriptive rights)
- K71 state and local agency processing requirements for corner records and records of survey (e.g., California Professional Land Surveyors Act)
- K73 graphical methods to represent land boundaries and related information
- K74 methods and procedures for preparing maps, plats, reports, exhibits, and documents (e.g., topographic maps, site plans, as-built plans)
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- K81 signing and sealing requirements

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Category E: Document Preparation (15%)

Document Preparation includes preparing necessary documents, legal descriptions, maps and exhibits based on clients' needs and contractual obligations and providing documentation of surveys based on all applicable statutes, rules and regulations.

- 16 Prepare land planning maps and documents (e.g., tentative or preliminary maps, zoning maps, annexation maps, site plans) and prepare maps to divide land into tracts or parcels (subdivisions)
- 17 Prepare corner records and prepare records of survey
- 18 Prepare legal descriptions (e.g., estates or interests in real property)

Knowledge Areas

Knowledge of:

- K03 federal, state, and local land surveying statutes, laws, rules, and regulations
- K04 laws, ordinances, and regulations related to land planning and/or development
- K05 survey methods, procedures, and standards
- K54 U.S. National Map Accuracy Standards
- K57 elements of topographic maps (e.g., contours, features, symbols, legend, metadata)
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